BREEDING and FEEDING THE MARKET HOG

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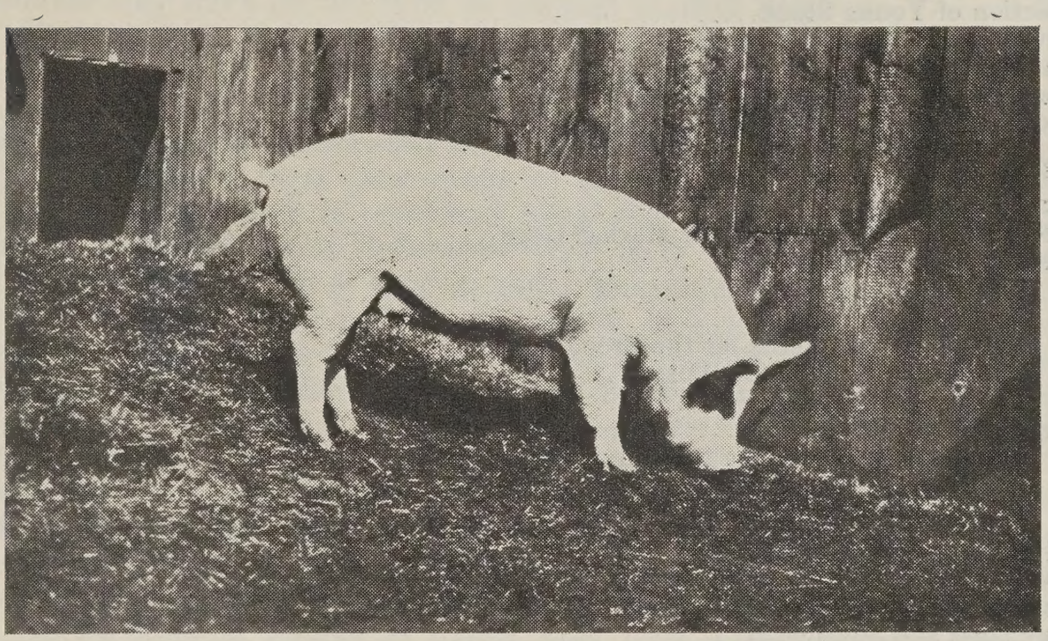

SELECT MARKET TYPE

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INTRODUCTION

The information contained in the following pages is essentially of a practical nature, taking the form of a discussion of the breeding and feeding of market pigs, largely as summarized and condensed from the conclusions and deductions offered by experiment, practice, and observation in connection with the herds on the Dominion Experimental Farms.

It is intended that special emphasis be placed upon the section devoted to discussion of feeds and methods of feeding and the effect which different feeds and methods may have on the type of finished market hogs.

BREEDS AND BREEDING

The swine-grading regulations have demonstrated fairly conclusively that in order to develop a large percentage of selects from our market hogs, the selection of breeding stock is restricted largely to three breeds of swine, the Yorkshires, Tamworths, and Berkshires, with their various grades and crosses. Strains of certain of the other more popular breeds, while capable of producing selects if properly fed are, however, as a whole, less suitable for the production of selects in any great number. There is no doubt but that certain strains of such breeds as the Duroc-Jersey, the Chester White, the Hampshire, and similar breeds could, in the course of a number of years, be developed into bacon-type hogs capable of producing a fairly high percentage of selects; but there is little to be gained from an attempt of this nature since there already are bacon breeds which serve the purposes admirably and meet the requirements of our markets. The labour and effort required to develop strains of hogs from the so-called fat type into bacon-type hogs would not seem justified. If it were the intention of the breeder to develop strains of bacon hogs from such breeds as the Duroc, the Chester or the Hampshire, his efforts certainly would be less successful than were his efforts confined to the improvement of the existing breeds of bacon hogs.

The Yorkshire.—The Yorkshire, or as the breed is known in England, the Large White, is undoubtedly the most popular pig in Canada to-day and represents the required bacon type possibly a little better than any other breed.

The sows mature early, are prolific, good milkers, and careful mothers. Breeding stock and market pigs of this extraction are good feeders, and with fair care and feeding will stand up well and prove thrifty to the end. Experiments have shown that where of good strain they will feed as economically and finish as early as any other bacon breed.

In some sections, notably in Western Canada, trouble is found with the young pigs of this breed, due to sun scald, this in turn due to their colour. Feeding indoors, providing plenty of shade, avoiding too early pasturing of young pigs, and lastly, the choice of strains of pigs with the right quantity and quality of hair, will largely obviate this trouble.

The breed crosses well and Yorkshire boars readily impress their desirable qualities on grade sows. As with every other class of live stock much depends on strain. Maintenance of strength is one of the problems of breeders of Yorkshires as with all other breeds, and depends on the care in selection of breeding stock and on the development of sound strains by the breeders themselves.

The Tamworth.—Of the bacon breeds, the Tamworth is probably second in popularity to-day. This breed some years ago represented excellent bacon type, then suffered a decline, and within the past three years has shown marked improvement. Generally speaking, they do not show quite the length or smoothness that characterizes the Yorkshire of to-day.

The sows are prolific and good mothers. Young breeding stock and market pigs, generally speaking, both in Great Britain and Canada do not show quite the easy feeding qualities of the Yorkshire. Good boars and breeding stock are a little harder to procure than with other breeds. Nevertheless, the breed is increasing in popularity particularly in Western Canada. Due to their colour, Tamworth pigs have some advantage over white breeds in the matter of withstanding sun-scald, and for this reason are slightly better suited to pasturing, aside from the fact that they are rather too active a breed for the very best results from this method of feeding.

The Tamworth crosses particularly well with other breeds, for example the Berkshire or Yorkshire. Where this system of breeding is followed the red pig should come in for consideration.

The Berkshire.—Although originating from a more or less lard type, the improved or Canadian Berkshire conforms closely to approved bacon type, differing radically from both the English and American Berkshires in that they are longer, smoother in the shoulder, and with a flatter side. The Berkshire is barely holding its own in Canada to-day. To begin with, the black pig is not popular with the packer. Then, while it is possible for the careful breeder to produce select hogs with this breed by careful selection and intelligent feeding, this is apparently more difficult in the hands of the farmer. Probably this is due to the fact that the improved type is not so securely fixed as in the case of the two previously mentioned breeds. Further, the Berkshire must be fed much more carefully than, for example, the Yorkshire, particularly the weaned pigs. Overfeeding is disastrous to the development of bacon type, producing a thick, short pig. Where properly fed, however, and of the right type, there is no pig that can make a pound of gain more economically than the Berkshire. As a shop hog, or for fresh pork purposes on the farm, they are unexcelled, with a large percentage of lean meat, well distributed, a good thick flank and belly, and a well-developed ham.

The Berkshire, outside of certain strains, is not usually so prolific as the Yorkshire or Tamworth.

Sows are generally exceptionally good mothers. Boars are impressive in their qualities but hard enough to find of the right kind. The breed crosses excellently, particularly with the Tamworth.

As pasture hogs Berkshire pigs are almost in a class by themselves. They are quiet and lack the activity of the other two breeds. Their colour prevents sunburn and they seem naturally adapted to outdoor life. They are suited to western conditions but seem to require milk for the maintenance of bacon type. Milk is scarce in Western Canada. Possibly the stronghold of the breed will soon be found in British Columbia.

Other Breeds.—No detailed description will be attempted in the case of other breeds, such as, for example, the Chester White, still bred in some parts of Quebec, the western provinces, and British Columbia; the Duroc-Jersey and Hampshire, found in Alberta mainly; or the Poland China, now mainly found in Alberta and British Columbia. Durocs and Polands are also found in south-western Ontario. For special purposes and markets, where thick-smooth hogs are acceptable, they have their place. They should have no particular interest for the farmer raising market pigs for the regular trade channels.

Mention may be made of the raising of shop hogs for local fresh meat trade. On certain markets there is a demand for a light-weight hog of good finish. The weight in this class would run from 140 to 150 pounds.

This trade is rather of a special nature to which feeders adjacent to fresh pork-consuming centres frequently cater. Many of the shop hogs, however, are simply graded from the market run. Practically all of the breeds may be so marketed, although the Berkshire or Chester White seem to have somewhat special qualifications, in particular the former.

BREEDING METHODS

IN-BREEDING.—Generally speaking, in-breeding must be handled most carefully with swine. No other class of stock will so quickly show the disastrous results of careless close breeding. Blind pigs, hermaphrodytes and abnormal individuals of all kinds are the first evidence. Mainly, however, the loss is through a weakening of the strain. In-breed for quality; out-cross for strength. In the hands of the expert breeder in-breeding has its place in development of type, quality, and strain. The farmer had best adhere to the plan necessitating the frequent introduction of fresh blood through boars of the right type.

LINE-BREEDING.—Although differing only in degree from in-breeding, careful line-breeding has been the origin of many of our best strains of pigs to-day. In this case the blood lines are similar but the individuals more distantly related.

CROSS-BREEDING.—The crossing of almost any two breeds of swine usually will result in increased strength and vitality of the offspring. When two breeds of the same type are crossed, the same type is secured in the cross-breds resulting. The pigs will invariably prove good doers, thrifty and easy to feed and finish. The Berkshire-Tamworth and Yorkshire-Berkshire are favoured. In that it is difficult for the farmer to maintain the two breeds and keep up a supply of pure-bred females, cross-breeding in the true sense is not a widely followed practice. The cross-bred pig should be for market purposes only, and there is always the danger of utilizing the good cross-bred sow as a breeder, a practice frequently followed by unsatisfactory results.

GRADING-UP.—The method of breeding which seems to offer the greatest source of revenue with the least expenditure for breeding stock is that of breeding-up the stock from common or grade stock to higher grades through the use of pure-bred boars of one breed on common or grade sows of good quality. Sows of this description can be procured for a small cash outlay and provided discretion is observed in selecting sows and these are mated to suitable pure-bred boars of a recognized bacon breed very rapid progress can be made in the development of a strain of bacon pigs which will run the pure-bred hogs a hard race for the honours in the production of selects.

This method of breeding for market hogs can be relied upon to give increasing numbers of pigs of the right conformation and type to grade into select bacon hogs, as the concentration of blood of the bacon breeds is increased through subsequent matings.

BREEDING METHODS ON THE FARM

SELECTION OF YOUNG STOCK

Too much attention cannot be given to the selection of the young brood sows. Aside from feminity the sow must show length, quality, smoothness and breediness. The essentials to look for are a clean-cut breedy neck and head, smooth compact shoulders, a true arch on top, strength and depth back of the shoulders, reasonable length of side, a reasonable spring of rib, depth of rib, strength of loin, width of hips, *and a generous supply of well placed and well developed teats.* This last point is very important in a brood sow. Summing these up, look for strength, depth, and mothering qualities in the brood sow but

not extreme length. The boar may go well along to the extreme length, provided he possesses with this, masculinity, strength, depth, smoothness and compactness of shoulder, and plenty of bone.

DEVELOPMENT OF A GOOD STRAIN

As already stated, the strain or family within a breed has much to do with the profits from feeding pigs. There is no reason why such a strain cannot be developed on the farm, even where only two or three sows are kept. Every swine-breeder knows that certain sows with which he has had to do are more prolific, better mothers and, therefore, able to raise a high percentage of their litters. Careful observation in this regard and the choice of young breeding sows from mothers with these qualifications, and that are of the right type and showing plenty of teats will, in all probability, carry on these desired qualities.

Unfortunately, the common practice on many farms is that of choosing two or three young sows from a litter, for future breeding purposes. These young pigs are chosen in many cases without reference to the qualities of their mothers, which, good or bad, will likely be hereditary. The young sows are bred and possibly only one litter is raised from them, after which they are fattened and sent to the market. While such a plan obviates the expense of carrying over a brood sow for a year, or between litters, it precludes any possibility of building up a good strain of pigs that show the really desirable qualities in breeding stock. It is a hit-or-miss method of breeding.

Further, in very many cases the losses from a young sow's first litter run proportionately high in that the sow with her first litter is frequently nervous and irritable and does not know what she is supposed to do with the crowd of little pigs which she finds around her. The percentage of raised pigs, in all likelihood, will be much higher in her succeeding litters, when she is settled down to her vocation. In short, it will pay the man who intends to stay with swine-breeding, through good and lean years, to keep a good brood sow until she ceases to become profitable and further, when he finds such a profitable animal, to keep from her young sows for future breeding purposes. After all, the profits from swine-rearing are in very direct relation to the number, size and thrift of the litter and the ability of the sow to rear them successfully.

Other things being equal, the sow that can raise a comparatively high percentage of pigs will make a profit for her owner. Put a premium on the good careful mother and select to retain this characteristic in the herd of sows kept on the farm.

MATING THE BREEDING SOW

Age of Young Sow.—Nothing is gained by breeding the young sow to farrow under one year of age, as she should be close to that age in order to have sufficient strength and vitality to withstand the heavy drain on her system resulting from the production of a strong, healthy litter. Breeding the immature sow will frequently result in small unthrifty pigs and may permanently stunt the development of the sow. Her mammary glands may not develop properly and as a result she may never be a good nurse. The time to breed the more mature sow is largely governed by the breeding plan followed, whether one or two litters per year, as already mentioned, the general condition and health of the sow, the period of oestrum and possibly the convenience of the owner.

Breeding the Sow.—It is poor policy to breed a sow which is down in condition, whether this may be due to having just weaned a large litter or some other cause. For a good litter, she must be bred when on the up-grade. The sow, however, will come in season once in three weeks and this must not be lost sight of in arranging for the breeding date. It will also be found to be the rule that the sow will come in heat approximately three days after the litter is weaned,

in the case of the healthy sow, and when she is in rising condition she may be bred at that time. The sow may also come in heat a few days after farrowing and some farmers make it a practice to breed at that time, if possible. Generally speaking, this practice is not in the best interest of the sow or the litter, as it may result in her milk supply being reduced and when she is nursing a large litter the pigs will not get enough nourishment and suffer accordingly. The period of oestrum is usually of two or three days' duration. In the great majority of cases larger litters will result from breeding the sow well on toward the end of the period.

After the sow is bred, watch her carefully for any signs of oestrum and particularly at the end of the three weeks' period, in order to prevent disappointment at a later date if she is found non-pregnant.

BREEDING FOR TWO LITTERS A YEAR

The production of swine in this country is seasonal or periodic, with the result that the supply of marketable hogs is irregular or periodic. The British market forms the pattern to which we must mould our hogs both in type of hogs produced and regularity of supply. The bulk of the hogs in this country come on the market between September and January, while there is a relative falling-off in the numbers marketed in the spring and summer. This condition is reflected in the trend of market prices which are invariably higher in the spring of the year. It is here that there are wide possibilities for the hog-raiser who is in a position to raise fall litters in addition to the regular spring litters. The majority of the spring-farrowed litters are dropped from March to June, and as the gestation period is roughly four months, or approximately 112 days, this means that the sows are bred between December and March.

Under the two-litter-a-year plan the spring litter must needs be farrowed not later than the middle of April. This is necessary since September or October may be regarded as the limit months for fall-farrowed litters, except in the case of the more specialized breeder who has special facilities for housing and caring for the later litter. The average farmer can, however, so regulate his breeding dates that the second litter will arrive not much later than the end of September. Since the gestation period is sixteen and a half weeks and the nursing period is at least six weeeks, there will, therefore, be a sufficient period between litters to give the sow a brief rest and have her on the gain before she is bred for the second litter. It is very important that she be given two or three weeks to get on the up-grade, particularly if she has just weaned a large litter. Close breeding should be attempted only when she is in good condition after rearing the last litter, where for example, the latter has been small.

The following table will give some idea of breeding under the two-litter-a-year plan, what might be considered the practical time limits.

BREEDING TABLE

	Spring		Fall	
	Breeding	Farrowing	Breeding	Farrowing
Early	November 14	March 6	May 7	September 1
Medium	December 6	April 1	May 26	September 18
Late	December 20	April 15	June 10	October 3

For the spring litter the sow should be bred from the middle of November to December 20 or not much later than that date and will then farrow from about March 6 to the middle of April. The sow may then be bred for the fall litter from about the first week of May to not later than June 10 or June 12 in order to farrow by the end of September.

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One vs. Two Litters per Year.—Comparative cost figures from the Dominion Experimental Farms show that where all items are considered (service-fee, yearly maintenance of sow, cost of pigs to weaning), the cost of rearing a pig in the average litter of seven to weaning age is $4.45 per pig, when one litter only is farrowed.

When two litters are farrowed yearly the cost per pig is reduced to $2.82 at weaning. In other words, the fall litter was obtained at an additional cost of $8.34 or an additional cost per pig of $1.19. This will demonstrate the possibilities in this phase of the transaction.

Limitations of the Two-litter-a-year Policy.—While it is possible to calculate most attractive profits from a herd of sows based on a regular production of two litters a year, such profits do not always accrue. While some sows will produce two litters a year throughout their lives, others will not, and the average will more nearly approach three litters in two years. If it is desired to raise some fall pigs, and spring litters must be delivered late, a suggested policy would be to divide the herd into two groups, one of these producing fall litters and the other spring litters. This will add to the cost but ensure stronger litters.

Another Method of Regularizing Supply.—Theoretically, if the production of litters by different farmers, groups thereof, or districts, was such that the resultant litters might be marketed during each month of the year, regular supply would result. The practical difficulties in the way are these: First, in farm routine the raising of young pigs in the spring and early summer fits best into the general scheme, one reason of several being that at this season milk-products are most plentiful, when most needed. Secondly, early spring litteers are necessary under the two-litter-a-year plan as discussed. Thirdly, the farmer with two or three sows can work more effectively where their litters come close together, giving him a lot of market pigs of uniform age, making possible a regularity and uniformity of feeding and care throughout the season and finishing in a unit, whether this be of wagon or carload dimension. Fourthly, while the production of litters throughout the twelve months is possible, it is not practical or profitable, at least for the farmer swine-grower. With reservations already made, the months of November to February inclusive should be taboo. There is this to be remembered, however, that while the spring and early summer months may be regarded as the natural farrowing season, litters may be reared with a satisfactory and profitable percentage of weaned pigs from March to mid October. The man who breeds for the arrival of litters later than the period March to June may expect to sell his pigs outside the period of heaviest marketing and, on the average, lowest prices. Where only one litter a year is raised, this is worthy of attention, after one has considered the point carefully from the standpoint of his own operations,—equipment, availability of feeds, ease of marketing, etc.

HOUSING

Not many farms are equipped with piggeries and the expense of constructing a piggery is not justified where only one or two brood sows are kept. Nearly all farms, however, have some suitable place where the brood sow may be housed comfortably during the winter and at farrowing-time. For the March or April litter a comfortable box stall will prove satisfactory until the pigs get a start. Until a week or ten days before farrowing the brood sow may be given the run of the yard during the winter and if provided with a covered sleeping-berth in a sheltered corner of the yard or a cabin which is dry and liberally bedded with straw, stronger and healthier litters will be the result than where confined in cramped, ill-ventilated and damp quarters in a corner of the stable where little or no exercise is possible and where she may become over-fat, develop digestive troubles and become crippled as a result.

The fall litter, when farrowed before the end of September, arrives at a time of the year when more freedom is possible and less difficulty will be experienced in meeting the needs of the newly arrived pigs.

For the man who wishes to extend his housing accommodation the portable hog-cabin is a useful addition. A cabin measuring $6\frac{1}{2}$ by $8\frac{1}{2}$ feet will house up to five sows comfortably during the winter and has the advantage that it may be hauled from one place to another. The sides of the cabin should be hinged at the eaves and when so constructed these may be raised in the summer and the cabin then serves as an airy shelter from the sun and elements. (See Exhibition Circular No. 101.)

For the man who desires to construct a more extensive and permanent piggery, the first consideration generally is low cost. On the Experimental Farms it has been proved that a low-cost piggery is desirable not only because of the first economy, but more important still because it can be made to provide the main requirements for satisfactory housing—dryness, freedom from draughts, simplicity and dependability of ventilation. For winter feeding these are of paramount importance. It has been found that fall pigs can be fed most successfully during the winter in cheap sheds with small doors open at all times to a yard, and with a low straw-covered, plank-floored sleeping-berth in the shed. The pigs get exercise, have a *warm, dry* place in which to sleep and *provided they are not forced too much in the way of feeding,* will come through the winter thrifty and active, without a sign of crippling, and in prime shape, generally, to obtain the relatively high prices applying during the spring months.

Based on satisfactory results obtained from experiments in cheap housing, the Experimental Farms have constructed several small, low-cost piggeries embodying all of the requirements. These are giving excellent results and plans may be obtained from the Central Experimental Farm, Ottawa.

FEEDS AND FEEDING

FEEDING AS AFFECTING QUALITY IN MARKET HOGS

THE CRITICAL AGE.—Live stock men all admit that feeding, whether it be bad or good, has a very distinct influence on the quality of the finished market animal. In fact, some feeders go so far as to claim that proper feeding methods are of equal importance to correct breeding. It may almost be safe to claim that within, at least, a very few generations type itself may be modified by the feeds fed and the system of feeding followed. The following pages have to do with feeding as affecting the type of the market hogs. Throughout, the importance of this one point will be stressed, namely, that there is a period in the life of all classes of live stock that may be considered of primary importance insofar as correct development is concerned. This period is of varying length, according to the longevity or life-period of the animal.

Ill-balanced rations, injurious substitutes, deficient rations, over- or under-feeding, lack of an intelligent understanding of nutritional requirements generally, all exert a particularly powerful influence during the early growing period as affecting later development. The human offspring is subject to the same grave dangers from early malnutrition as is the little pig as the digestive systems of the two are not dissimilar. The foundation for proper results in the feeding of the market hog is laid largely *upon the condition to which the feeder is able to bring his young pigs at the age of three months.* This is the really important period of the pig's life and the period during which the hogman shows his true skill.

FEEDING BREEDING STOCK

In a discussion of swine-feeding methods it is impossible to restrict oneself to the actual feeding of the market hog as an individual. One must go further back. In fact, one should possibly go back several generations. In this

discussion, however, it is assumed that the feeder realizes the significance of market type, and of market type as applied to breeding stock, and that he knows the characteristics of a good brood sow and of a good bacon-type herd boar. Breeding stock necessarily must differ slightly in type from the purely commercial or market hog. However, there must be included all of the essentials of bacon type, with the addition of such characteristics as are desirable purely from the standpoint of reproduction—strength, depth, capacity, bone, and smoothness.

FEEDING THE BOAR

To go back, however, to the feeding and management of the parents of market pigs, first, consider the boar. Too many boars are ruined both from the standpoint of length of service and of size, strength, and the vitality of the litters which they sire, by close confinement and either lack or excess of feed. The boar should be given facilities for exercise outdoors in the summer, and even in the winter, unless he can be provided with a large box-stall or shed. His feeding must be such as to keep him in good breeding form, and as this general term will be used elsewhere, it may be described. An animal in good breeding form is not fat, and, on the other hand, is not thin, but healthy and hard, a condition resulting from exercise, fresh air, and a sufficient amount of wholesome food. The boar should receive much the same feeds as do the brood sows; pasture and green feed in the summer, a light meal ration, depending on his condition, consisting of ground oats, shorts, middlings, and a little barley. He should have plenty of natural foods or green foods at all seasons of the year. In the winter, much the same ration should be fed, plus pulped or cooked roots, clover hay or alfalfa, and access to mineral matter such as will be discussed later on. But, above all, he must be exercised, occasionally this may be done best by housing him with two or three brood sows. This gives him company and keeps him more contented. On the nature of the individuals depends the possibility of such arrangement.

FEEDING THE BROOD SOW

The condition of the sow at breeding time has much to do with the size of the litter, the size of the pigs and their vitality. The sow that has but recently been weaned from a large litter is not in a position to do herself justice, where bred too soon after the first farrowing. She must be given a sufficient period to recuperate, build up her tissues and be on the up-grade in so far as condition is concerned rather than on the down-grade. Flushing the ewe is an old and well recognized practice. It applies to the brood sow almost equally well. The sow, however, should not be fat either at breeding time nor in the subsequent period of pregnancy until the farrowing time closely approaches. Then her condition should be good, but a condition the result of an outdoor life with plenty of exercise and the result of feeds largely made up of roughages and succulents. Not only are such feeds cheaper—because they are home-grown—but they supply the elements necessary to proper functioning of the in-pig sow. During the summer, of course, brood sows may be most cheaply and healthfully maintained for their fall litters by the use of pasture. Whether pasture is to be recommended or not, in the case of the market pig, it surely can be recommended in the highest terms for breeding-stock. Where unlimited pasture is available and particularly where this may be supplemented by green feeds such as garden refuse, waste apples, tomatoes, etc., the brood sow may be maintained very cheaply during the summer and fall months, with a light ration largely made up of shorts, bran, and oats—corn and barley to be used only where the necessity of such feeding would be indicated by lack of condition.

As winter approaches, and sows must be housed a little more closely, the question of the type of housing and its effect upon the litter, must be considered. Housing the brood sow indoors where she may be given, supposedly, every com-

fort, constitutes the greatest mistake and a misplaced kindness generally. Resultant litters may be weak and flabby, or thin, under-sized weaklings. On the other hand, the brood sow may be housed in small, open cabins, where she has to bear the brunt of the winter inclemencies of weather. Under the latter conditions, where properly fed, excellent results may be obtained, but the feeder must expend more feed to withstand the cold. The intermediate course is best—allowing the sow or a group of sows the use of a partly open shed with access to a barnyard or paddock, and building within the shed a low, straw-covered bunk or berth, well bedded, where the sows may sleep comfortably, dry and away from draughts. There is no class of stock that benefits in any way from draughty quarters.

The place of feeding may be situated some little distance away from the housing quarters. Where such arrangement is provided, exercise is forced on the sow, and (as in the case of many human beings) the tendency on the part of most brood sows is take little exercise unless it is forced upon them. Their hay racks, for example, may be placed out-of-doors, for the amount of alfalfa or good clover hay that a brood sow will consume to the ultimate benefit of herself and her litter is not appreciated by the majority of feeders. Any sort of open rack that will allow the sow access to a good mouthful of hay will be found satisfactory. There is but one thing that must be kept in mind—that is, *to keep the rack full!* Roots are a necessity, and if there is any choice, possibly pulped mangels will be found the most satisfactory. For the pregnant sow they supply a food in its natural form and with which the vitamines have been subject to no interference. Incidentally, too, the less labour that goes into the preparation of feeds, the cheaper the maintenance. Turnips are not palatable to the sow in the same sense as mangels, where fed raw. It is almost necessary to cook them, and the same would apply to potatoes.

The meal ration may be fed mixed with, or on top of, the pulped roots. Just what ration is adopted will depend upon the condition of the sows and the quantity, if any, of household or dairy refuse or by-product that may be available. Generally speaking, the brood sow does not require dairy by-products in the same sense as the market hog. Where only one or two sows are kept, however, a great deal of food is available from the household that is of the greatest value to the sow. Further, where only a few sows are kept and where they have the run of the barnyard, they are able to pick up a lot of their living during the winter in the form of undigested grains, waste feed from the horse and the cattle barns, clover or alfalfa refuse, etc., etc. For the sow in good condition, several feeds are available—bran, shorts, screenings (standard recleaned screenings), oats and barley. Rations used on the Experimental Farms are as follows: bran and shorts, equal parts; bran, shorts, ground screenings, equal parts; bran, shorts, oats, equal parts; bran, shorts, oats and barley, equal parts. It will be seen that bran appears in all rations. It is essential on account of its healthful, laxative qualities. In some districts, alfalfa meal is available. This is an excellent winter feed for brood sows, but, of course, may be more cheaply replaced by the use of alfala hay fed in racks. As to quantities fed, this is a dangerous point on which to attempt advice. The eye of the feeder, after all, is the best gauge as to the quantities of feed which an animal may economically and healthfully consume. Generally speaking, meal should be fed at the rate of from two to four pounds daily. Keep in mind that the meal ration must tend towards a laxative nature; this is where a proportion of bran is essential.

Constipation in the brood sow is productive of bad results not only to the individual herself but more particularly and disastrously to her litter. The healthful development of the unborn animal is largely controlled by the correct scavenging and cleansing of the system of the dam. It is in this connection that exercise and fresh air play such an important part, in conjunction with proper feeding methods as described.

SUPPLEMENTARY FEEDS FOR THE BROOD SOW

Mineral Feeds.—In a general way, mineral feeds should be supplied to the brood sow. Everyone is familiar with the quantity of earth and earthy material that the sow will consume during the summer months or at any time that she has access to the ground. Just what elements the sow may require will depend on factors concerning which, as a general rule, we have incomplete knowledge. For example, sows in one district may lack in lime, this due to a lack of lime in the soil and in the feeds which that soil grew. Others may lack phosphates, so that it is difficult to lay down any general rule for mineral feeding for any class of stock. Anyone who has withheld earthy feeds from sows, however, will realize just what effect it has on the litter. One of the cheapest and best winter mineral feeds for sows *is a supply of sods laid up in the fall.* Charcoal, hardwood ashes, or charred wood are also used, and, in most places, are procurable. Soft coal, or slack coal, is also useful and procurable in the West and some sections of the East. The practice followed on the Experimental Farms is to supply sods where possible, and ashes. Failing these, commercial charcoal or soft coal is supplied. In the meal ration, excellent results have been obtained by the use of bone meal and tankage or meat meal. It is a well-known fact that the development of the unborn litter calls heavily upon phosphates and lime. Bone meal has a high calcium phosphate content and several of the large packing firms now manufacture high-grade edible bone meal. This may be fed at the rate of one to two pounds of bone meal to the hundred pounds of meal mixture. If desired, a like quantity of ground or pulverized charcoal may be added, as charcoal is also high in phosphates aside from its desirable sweetening and absorptive properties within the digestive tract. Tankage or meat meal is undoubtedly of value in the case of the brood sow, not entirely on account of its high protein content but also from the fact that it contains soluble mineral salts of animal origin. Tankage may be fed in self feeders allowing the sow to take what she requires. This, however, may be wasteful and the practice followed on the Experimental Farms generally is to utilize from 3 to 5 per cent of tankage, that is. from 3 to 5 pounds to the 100 pounds of meal mixture.

Further Supplementary Feeds.—Potassium iodide has been proven to be highly efficacious in the control of hairless litters, such being due apparently to an insufficiency of iodine in the animal's system. While hairless litters are not common in the East, they are all too prevalent in Western Canada, due to conditions more or less obscure.

One ounce of potassium iodide dissolved in one gallon of water forms a stock solution, one tablespoonful of which fed daily per sow will supply two grains of potassium iodide, which is ample during the pregnant period or a greater part thereof. While potassium iodide may thus be fed as a definite preventive to a known or anticipated condition, apparently it has also certain desirable effects on development generally, that is, a very minute quantity of potassium iodide administered daily to the brood sow, insofar as experimental work has indicated, is responsible for the production of stronger, healthier little pigs. More experimental work is required in this connection before a definite statement can be made.

PARASITES

The matter of preventive methods against infestations of the round worm is taken up at this point, in that the life-cycle of this parasite would appear to be open to most effective attack through the medium of treating the brood sow.

Preventive Feeding for Round Worms.—The common round worm (*Ascaris lumbricoides*) found in the intestines of mature or adult pigs constitutes a grave menace to swine-breeding in many herds, particularly on premises where swine have been maintained in numbers on the same ground for years.

The adult form of this worm, unless present in great numbers, causes comparatively little loss or lack of thrift to the host, admitting, of course, that the pig would be much better without them. The really dangerous period of the life-cycle of this parasite is during the larval stage. For example. the brood sow, with her litter at foot, may harbour a few round worms. The eggs, as deposited by these worms or as found on the floor of the pen, are excreted and come in contact with the litter and floor of the pen, gaining entrance to the mouths of the little pigs as the latter are rooting about and suckling their mother. This egg soon hatches, and a tiny worm is liberated inside the stomach and intestines. From here it burrows through the lining of the intestines and finds its way to the liver and other organs, eventually reaching the heart and lungs. Having reached the lungs it sets up irritation, causes considerable coughing, affects the outward condition and thrift of the little pig immediately, and finally may cause death due to bronchitis, pneumonia, pleurisy, etc. The little pig is most seriously affected from the age of five to eight weeks, and even when it survives, its thrift and economy of production is interfered with seriously.

Oil of chenopodium is recommended as one of the best worm expellants. It is expensive and sometimes difficult to procure. One recommended method of administration is to mix with slop after having withheld feed for twelve hours. While simple, this method is objectionable and uncertain, owing to the pungent odour and general unpalatability of the oil.

The better way is to procure some veterinary gelatine capsules and administer oil at the rate of 2 c.c. (40 drops) per 100 pounds. For the 400-to 500-pound sow, for example, approximately $\frac{1}{3}$ of an ounce would be required. Place the capsule on the back of the pig's tongue and press or work the throat until the pig swallows. Some breeders arrange a small crate or chute which confines the pig. In the ceiling over the pig's head, is a pulley through which passes a short length of rope with a soft wire loop in one end. This loop is placed in the pig's mouth and the head raised, facilitating the introduction of the capsule. In the latter connection a small balling gun works well.

This treatment should be followed by the administration of castor oil, two tablespoonsful per pig in skim-milk. Keep pigs separate for a day or so after treatment.

The sow should farrow in a clean, well-disinfected pen. Lime in the slaked or dehydrated form is one of the best disinfectants on the farm and lends itself well to this particular requirement.

Weaned or growing pigs may be treated in like manner. The life cycle of the round worm, however, is such as to make clear the desirability of treating the sow and keeping the young pigs as free as possible from infestation. Afterwards—clean pens and fresh ground (ground not used by pigs for a year or so).

The McLean County System.—What is known as the McLean County System of prevention, has apparently worked well. This in brief is as follows: The sow is thoroughly washed and the farrowing pen cleaned and disinfected with lime or a lye solution of 1 pound of lye to 40 gallons of water. After farrowing, the sow and little pigs remain in the pen for ten days, after which they are turned out on a clean paddock or pasture with a cabin for shelter where they remain for three or four months.

In this system the sow is not treated, particular attention being given to clean quarters. It would not work well in the case of early litters in Canada. Undoubtedly cleanliness generally and the use of fresh quarters and ground is one of the important preventive factors.

Lung Worm.—This, too, is prevalent in many herds and exceedingly difficult of control, in that where treatment is concerned, drugs or preparations that will kill the worm in the lungs, will unfailingly kill the pig as well. Undoubtedly this controls the worm but interferes with the profits. The practice of using lime

in the bedding and of sprinkling it generously over the floors and through the bedding that the young pigs are using, has given good results, as apparently a certain amount of the lime is drawn into the lungs and has a desirable effect in dislodging the parasite. The only sure way of controlling lung worm infestation, however, is a removal of the whole swine-breeding plant to fresh ground.

In connection with the parasites, generally the round worm is the most common, and in large plants undoubtedly constitutes a menace that many breeders at the present time do not recognize. It exhibits itself in heavy losses between farrowing and weaning and up to 100 pounds in weight. The oil of chenopodium treatment is an excellent one, the only drawback being the frequent difficulty in securing the oil of chenopodium and the comparatively high price of this product.

While dealing with the subject of parasites, it may be well briefly to mention lice on breeding stock. Where present in numbers, undoubtedly they affect the thrift of brood sows and pigs of all ages. So easy is their control that there is no excuse for their presence. Any non-irritant, cheap oil proves fatal to the hog louse. On several of the Experimental Farms, pale paraffin No. 1, a cheap, light, non-irritant oil, procurable from refineries or distributing plants, will give excellent results. Axle-grease, fuel-oil and low-grade castor oil are useful as well, particularly the latter.

FEEDING THE NURSING SOW

The brood sow that farrows in good condition, tending toward being fat, and that has had exercise outdoors and been fed with rations as described, may be expected to farrow a good, vigorous, thrifty litter. During her nursing period, there is on rock upon which many feeders strike hard—failure to realize the disastrous effect of an overheated or constipated condition of the sow, particularly where she is being fairly heavily fed to nurse a large litter. Such a condition will invariably cause heavy losses in the youngsters and those that survive will tend toward being short, stunted and thick as they develop. The first feed should be a warm slop of middlings. During the first ten days, gradually increase the ration to the maximum, seeing that from the very start *the little pigs have exercise*. By so doing, thumps, an incurable condition, will be avoided. Ground oats of good quality, bran, shorts and middlings, equal parts, is a good ration, and may be fed with diluted milk products, for example, equal parts of skim-milk and water. There is just a doubt as to the advisability of the unlimited use of dairy products with the brood sow in good condition. Many poor-doing litters are rendered so because of over feeding from a deep-milking sow. See, too, that the sow gets exercise, because this means more perfect scavenging and more natural functioning of her excretory organs, generally. In the winter and spring, a few roots, some clover hay and bran, of course, will tend to keep the blood cool. Empty a pailful of earth and wood ashes in a corner of the pen every few days and note how soon the little pigs gravitate toward this corner. If there is one point in the treatment of the brood sow that must receive attention it is that of exercise, not only of the dam but more particularly of the little pigs. Force it upon the latter if it cannot be had in any other way. This may be necessary with early litters indoors.

Black Teeth.—There is a superstition that "black teeth" constitute a fatal condition in the suckling pig. The presence of long milk teeth, black or otherwise, undoubtedly is fatal in most cases. The little pig bites the sow when suckling, she jumps up suddenly and the litter is reduced frequently by trampled pigs. Examine their mouths when two to three weeks of age, unless trouble is seen earlier. At this age the four upper teeth gradually become black and should be nipped off with a small pair of pliers. Removing these teeth at an earlier age, when the gums are tender, causes soreness and the pig does not suckle properly.

FEEDING WEANED PIGS

Supplementary Feeding for Nursing Pigs.—*The weaning period is truly the dangerous one*—that period when the little pig leaves the mother's milk and all too frequently is abruptly changed to a ration far different and far from what his system requires. This change should be made gradually, commencing about five weeks of age, the youngsters being taught to eat in a creep, which excludes the mother sow. At weaning time, by increasing the food of the young pigs and removing them for longer periods daily from their mother, the shock to the system of the abrupt change of ration is greatly lessened. More good litters are ruined by the results of improper feeds and feeding by ill-defined methods at the period mentioned, and more swine-feeders thereby baffled and discouraged, than during any other phase of the pig's existence. The first feed for the little pig, when he is learning to eat and while nursing with the mother, should be made up of a few handfuls of dry grain scattered in the bedding. Crushed oats is excellent. By this is meant rolled oats, where such may be procured. Place in the creep a little trough containing milk, then a few days later add a handful or so of middlings, and increase this until weaning, weaning at six weeks of age where the two litter-per-year plan is operated; otherwise eight weeks. This is contrary to the procedure on many farms where pigs are weaned at five or six weeks of age. Due appreciation must be given to middlings as a feed for little pigs. There is a distinct difference between middlings and shorts. Middlings cost more but are infinitely cheaper in the end.

Another and possibly a better plan, is to start the nursing pigs on a mixture of equal parts of middlings and finely ground oats (good plump well-filled grain from which most of the hulls have been sifted). Feed this mixture, preferably dry, starting with a handful or so. In many cases the tendency toward scouring is lessened where the meal is fed dry. Skim-milk may also be given daily. Feed it separately and see that it is sweet during the first few weeks, after which best results will be obtained by feeding it slightly soured. Good results are had where the oats in the foregoing mixture consist of ordinary and hulless oats, half and half.

Rations for Weaned Pigs.—After weaning start grain feeding as follows: daily ration for the two to three months pig weighing about 50 pounds—1 pound of a mixture of sifted oats, 1 part; shorts, 1 part; middlings, 1 part; and linseed-oil meal, 5 per cent; with five pounds of skim-milk, daily. Soak for twenty-four hours and feed. Equal parts of middlings and oats supplemented with 5 per cent of linseed-oil meal and skim-milk are also most satisfactory. Digester tankage can be substituted at the rate of 6 per cent to 8 per cent of the meal ration if skim-milk is not available. If the pigs are pen-fed, scatter a very little dry grain, whole oats or cracked corn in the litter. Unless otherwise specified all grains are finely ground.

Another good weaning ration which will serve until about four months of age is as follows: middlings, 300; oats, 200; shorts, 100; barley (or corn), 100; bran, 50. Where middlings is not available the following mixture is good: oats, 300; shorts, 200; barley (or corn), 100. For the winter-fed pig a little bran in the ration is recommended as in the first of the foregoing mixtures.

From four to five months this mixture is a good one: shorts, 200; oats, 200; barley or corn, 150; bran, 50.

Finishing.—From five months to finish, the thrifty, active pig can stand heavier feeding: shorts, 100; oats, 200; barley, 200 (or barley, 100; corn, 100). Shelter the paddock or pasture-fed pig either with a portable cabin or a light open-sided shed. Avoid particularly turning the weaned pig outdoors in a shadeless paddock. Sunburn, skin trouble, temporary and often permanent stunting ensues. Have natural shade if possible, and supply clean fresh water. All the

way through, feeds are best soaked for from twelve to twenty-four hours. Palatability, digestibility and ease of assimilation are benefited. Feed slop warm in winter.

Other Good Fattening or Finishing Rations

1. Ground barley, 4 parts; shorts, 4 parts; peas, 2 parts; linseed-oil meal, 5 per cent; skim-milk, 3 pounds.

2. Ground oats or barley, 4 parts; shorts, 4 parts; corn, 2 parts; linseed-oil meal, 5 per cent; skim-milk, 3 pounds.

3. Ground wheat or shorts, 2 parts; barley, 2 parts; ground pease or corn, 1 part; linseed-oil meal, 5 per cent; skim-milk, 3 pounds.

Numbers 1 and 2 would be applicable to central and maritime conditions, while No. 3 would be more adapted to western needs.

FEEDS THAT MAY BE PRODUCED AT HOME

At this stage, lest it be inferred from the foregoing that meal mixtures and purchased mill-feeds constitute the main feeds for the market pig, a brief discussion follows concerning what is undoubtedly one of the most important aspects of the whole operation.

A man may be a skilful feeder of market pigs,—may be able to produce a high percentage of selects—and yet in spite of good prevailing prices, do so at a distinct loss. Profits from swine as with other lines of animal production on the farm, are largely controlled by *the ability of the feeder to make the best use of the feeds which he finds to hand or that he can produce at cost.* Supplementing such feeds by the purchase of mill-feeds is necessary in the case of the hog, for wheat by-products and certain concentrated feeds are peculiarly necessary to this class of stock. The providing of much of the ration at home at cost, goes far toward ensuring profits.

GRAINS

Oats form one of the greatest single grains for the market hog and have a peculiar value in the development of the select pig. Undoubtedly this grain should predominate in the ration up to three or four months of age and enter largely in the finishing ration as well. Indeed, it is possible to produce a good market pig on nothing but oats, milk, and the necessary mineral requirements, from start to finish. While such a limited ration is by no means recommended, it tends to show the possibilities of this grain, not thoroughly appreciated by many feeders. No other single grain will make such a good market pig as oats.

Quality is essential. Light, shrunken, poorly filled grain is of little value. An excellent plan is to build up the quality of ordinary ground oats by the addition of one-quarter to one-half the total oat mixture of hulless (Liberty) oats. This is of particular value to the young pig and good practice throughout the whole period of feeding.

Barley is possibly second in importance. This grain does not impart the growth and stretch, the muscle and bone that comes through the liberal use of oats. Therefore, it should be used sparingly during the first four months. Grow the frame with oats; put on the finish with barley. (See rations recommended in last chapter).

Barley should be grown by every hog-feeder. Experiments have proven that it is almost if not quite, the equal of corn, although lacking slightly in comparative palatability.

Peas constitute a splendid part of the finish ration either fed ground or self-harvested from the field by the hog. Not half enough peas are grown by hog-feeders. "Canadian Pea-Fed Bacon" was once the slogan of the Canadian bacon trade in Great Britain.

Wheat is another grain almost the equal of oats as a single grain, although it enters best into mixtures. With the exception of Western Canada, however, where damaged and low grades are largely used, wheat usually enters the ration through the by-products from flour manufacture,—shorts, middlings, bran, feed-flour, etc.

Buckwheat and rye may also be mentioned as of value.

PASTURE AND GREEN FEEDS

Pasture may undoubtedly be put to good use on the average farm. This method of feeding, however, has disadvantages, particularly with the active bacon hog—from the standpoint of fast finishing it gives opportunity for excessive exercise and is liable to stunt little pigs due to sunburn and the combined effects of sunburn and dew. With plenty of skim-milk or buttermilk available, experimental evidence and that of practical feeders indicates that growing bacon pigs may be fed for market more economically indoors or in well-shaded pens supplied with racks for the feeding of green feed, preferably in the form of clover or alfalfa. Racks are essential to the prevention of waste.

Where pasturing is employed, alfalfa and clover are the best crops, in the order stated. Pasture a sufficient number of hogs to keep down the growth, but avoid too close grazing. Heavy seedings of oats or barley pastured when about six inches high, have given excellent results if kept sufficiently grazed down. Rape is another useful crop best suited to the pig from four to five months old. For fall feeding, artichokes have a high feeding value in conjunction with rape, clover or grass.

Where Pasture is Invaluable.—For brood sows, and young breeding stock, pasture provides not only the cheapest but the most healthful method of feeding. The growth of bone and muscle and vigour generally is accelerated. For the pregnant sow, where a light meal ration is provided, such outdoor conditions prove ideal.

Self-harvested Crops.—Besides the true pastures, other crops may be pastured profitably. Corn may be "hogged off",—an American plan; peas, or peas and oats, form an excellent crop of this kind; artichokes are splendid for a part of the fall ration. Such methods still further lower production costs. The pig gathers, grinds and prepares his own food. Peas form one of the best self-harvested crops for pigs in Canada.

ROUGHAGES AND SUCCULENTS

Hays.—By no means the least important items among home-grown feeds are the hays. Alfalfa hay, cut green, preferably of the second cutting, and well cured is one of the very valuable feeds, in particular for the brood sow, but also for the market pig. Where alfalfa hay is available, keep it in a rack in front of every kind and age of pig, when pasture or green feed cannot be had.

Good clover hay, second cutting, is most useful and oat hay is proportionally relished. Even corn silage may be utilized to fair advantage especially where a few handfuls of meal are scattered over it. The main thing is to provide some kind of palatable, digestible, nourishing roughage, preferably, of course, alfalfa hay, before pigs. They need fibre and will get it in some form if only through eating straw; it is cheap, comparatively little is eaten per head, and experimental evidence is to the effect that it promotes thrift and health in the pig and profits to the owner. Not all feeders realize this.

Mangels, Sugar Beets, Turnips.—As have been pointed out, mangels are practically a necessity in the economical winter feeding of the sow. Regular feeding, if even in very small quantities, to the market pig has a marked effect on health. Mangels in particular form one of the valuable feeds that not only

can be but must be home-grown. Turnips are good and are best cooked. Cull potatoes frequently are available, and the pig may be utilized for economical salvage thereof. Artichokes are not appreciated as they once were. They form a heavy crop, especially palatable to the hog and, of course, are self harvested. Cull apples and waste garden products are valuable. With these, however, it is usually either a feast or a famine.

Mangels should be the stand-by.

MILK-PRODUCTS

As a class, these form the most valuable of all hog-feeds, either purchased or home-produced. Other things being equal, the availability of milk in some form is the most reliable insurance of the development of select hogs. Where milk by-products are scarce, as in the western provinces, and where little pigs are weaned abruptly from the mother to a milkless ration, a low percentage of select hogs usually results. There are partial but not complete replacers. (See Tankage and Meat Meal.)

Skim-Milk and Buttermilk generally are classed as of equal value. As a matter of fact buttermilk, where fed fresh, is superior. For the weaning pig skim-milk is best and should be fed sweet and warm; later on, milk is best slightly soured, adhering to a uniform degree of souring. These two products have a common commercial value of from 20 to 25 cents per cwt. This is fair. Milk may be worth as high as 50 cents in the ration and occasionally attains a value of 65 cents or even more. It attains its highest value while the pigs are under four months of age, after which, if necessary, it may be replaced best by some good meat meal.

Whey generally regarded as of about half the value of skim-milk is, nevertheless, of great value in growing a bacon hog. Best use may be made of it during the intermediate and later growing stages.

Semi-Solid Buttermilk is now available and while forming practically the equal of the fresh product is, at present, rather too expensive as a feed for market pigs. Commercial milk powders are available occasionally and where of good quality, offer possibilities. As a rule, all concentrated milk products are too high in price but even so may prove economical for a month or so after weaning.

Finally, *the feeder with a home-produced milk by-product at his disposal, has the cheapest, safest, most productive, most palatable, and surest feed available, and the one item of diet that practically insures quality and type at finish.*

FEEDS THAT MUST BE PURCHASED

Attempting to feed hogs purely on home-grown feeds is not recommended. Occasionally it pays best to dispose of all or part of home-grown grain and to purchase certain mill-feeds—which is quite comparable to plan of feeding home-grown grains in any case. Barley is a good grain for Canadian hogs. The farmer can feed a part of it and exchange the balance for shorts, middlings, etc. Incidentally, barley of good quality is high in price, almost invariably.

WHEAT BY-PRODUCTS

Middlings.—A necessary feed for young pigs and one which should appear in the grain ration in diminishing quantities up until the pig is four or five months of age. As a rule it sells for six or eight dollars more per ton than shorts. For young pigs, due to its low fibre content, it is worth the difference.

This difference between shorts and middlings is not appreciated by many feeders; indeed a fact not readily explained is that middlings is procured fre-

quently with difficulty in the western provinces where it originates, whilst it is a regular item in the ration of the pig fed in the Maritimes.

Shorts.—As the quantity of middlings is lessened in the pig's meal mixture, shorts may be increased (see rations already suggested). Shorts is one of the standard mill-feeds for pig feeding. Where it must be used from the start, a common practice is to add sufficient feed-flour to better the quality and lower the fibre percentage of shorts.

Bran is, of course, the most valuable and widely used wheat by-product for stock feeding generally. It is palatable and peculiarly useful on account of its healthfully laxative qualities. Thus it forms a standard feed for the brood sow. As will have been noted, it has a most useful place in market-hog rations as well—where a little more bulk or lightening of a heavy grain is necessary. It may be used advantageously in the case of the winter-fed pig.

Feed Flour.—While less used than the three foregoing feeds, feed flour is of value in concentrating a too fibrous feed or mixture. For example, it may improve shorts or bran. As it is relatively high priced, careful consideration should be given to its purchase in comparison to other available feeds, purchased or home-grown.

(*Note*: For more detailed information concerning the composition of the foregoing feeds and food-stuffs generally, the reader is referred to "Farm Feeds," Bulletin No. 36, by Dr. F. T. Shutt, Dominion Chemist).

CORN

Not so long ago corn was considered the hog feed par excellence. In the United States, particularly in the "Corn Belt," corn still occupies this place.

Corn is peculiarly palatable to the pig. It is productive of high gains, and yet there are reasons why it should be fed with extreme care in bacon hog production. In the first place, generally speaking, corn is an imported feed, for excepting mainly the southern counties of Ontario, corn as a feeding grain comes from the American corn-belt. Barley, on the other hand, is peculiarly a Canadian grain. Secondly, the effect of heavy corn feeding on type and quality is well known; the thick-smooth hog quite frequently results and worse still, the desirable firmness of side may be interfered with—the much decried soft pork or soft sides resulting.

Keeping the foregoing in mind, however, excellent use may be made of corn. It should enter the earlier rations in very small quantities. From four to five months on, up to one-quarter of the grain ration may consist of corn; in fact for the finishing two or three weeks, as high as one-third to one-half. It will be found an economical feed if thus carefully and sparingly used, mainly on account of its palatability and fattening qualities. Thus, where available, it may work in well with barley, rendering the latter more acceptable. After all, variety and palatability are all too frequently overlooked in pig feeding. Here corn is most useful and may attain a maximum value, intelligently used with other grains and mill feeds.

GRAIN SCREENINGS

Grain screenings very frequently are available to eastern feeders as well as those in the west. Where of Standard quality (Standard Recleaned Elevator Screenings) this feed is a useful one for several kinds of stock but particularly for swine feeding, comparing most favourably with standard feeds and mixtures. (See "Elevator Screenings as a Food for Live Stock" pamphlet No. 18). Much depends on the quality, the percentage of wheat and other grains, wild buckwheat, etc. and on a comparison of prices of this with other standard feeds.

PACKING HOUSE BY-PRODUCTS

These form a class of feeds of growing importance in swine feeding. It must be remembered *that milk, a home-produced feed, is supreme in this field.*

Tankage has been long and favourably known as a high-protein supplement and milk substitute. In the corn-growing states the use of a high-protein tankage is altogether necessary, balancing as it does a highly carbonaceous (corn) ration. Canadian rations differ radically, however, in that they are generally less highly carbonaceous, contain more growing feeds, more variety and better balance. Therefore, the use of high-protein supplements would not seem economical, particularly as the latter are relatively high priced. Latterly the tendency of several of the large packing plants has been to manufacture a good meat meal, lower in protein but containing more of a meaty nature, as the name would imply, and representing a different by-product generally from tankage. Briefly, the latter is that part of the packing-house by-product that cannot be reduced further by heat.

Tankage or meat meal may be used economically in the ration of pigs of practically all ages. Even where milk is fed, three or four pounds of meat meal may be fed with good results, not so much that an addition of protein is required, but rather due to the fact that the pig *relishes an animal food.* Left to his own devices he would be a meat-eater to some extent. Meat meal or tankage adds a certain spice to the ration, not to mention the important fact that it contains mineral salts in a readily available form.

For the in-pig sow, tankage supplies part of the animal food and the mineral elements so much required by the litter *in utero.* Stronger pigs are usually the result. The sow so fed will rarely devour her pigs or show any tendency toward such action, excepting in the case of the naturally vicious individual. Sows showing such abnormal tendencies usually do so with cause, the ration likely having been deficient in mineral requirements, animal foods and succulents. From 5 to 10 per cent of the meal ration may be made up of tankage or meat meal.

When no milk whatever is available, weaning should be delayed as long as possible, starting the pigs on a dry meal ration as already described, and gradually changing to a slop at weaning time to which has been added from seven to ten per cent of tankage. (Seven to ten pounds of tankage in each hundred pounds of meal). While results from tankage at this period are not generally comparable to those possible with a milk ration, the addition of this product will be found profitable as compared to a ration containing no supplement.

Where pigs may be weaned on milk with a three per cent tankage addition, and the milk gradually reduced and finally discontinued at three months of age, much better results may be secured. As the milk is reduced the tankage or meat meal may be increased up to seven per cent and later to nine or ten. Where milk is available up to four months, the results are even more satisfactory. Unquestionably the following of some such plan, combining the use of milk and tankage allows these supplements to obtain maximum values, economizes in milk—often a scarcity—and provides for the gradual change so necessary at the critical weaning period.

MINERAL SUPPLEMENTS

No domestic animal so quickly shows the results of mineral deficiency as does the pig. The development of the market pig is exceedingly rapid, comparatively, attaining a finished weight of around 200 pounds in six or seven months. Naturally, there is a heavy call on the bone-building constituents, calcium and phosphate in particular. The fact that the market pig is frequently closely housed or pen-fed during summer or winter, and that during the latter season, in any event, access to the earth is denied him, means that every care should be given to the matter of mineral supplement to the ration.

PROVIDING MINERAL REQUIREMENTS AT NO EXTRA COST

The live stock feeding policy which makes the feeding of alfalfa and clover hay a feature, goes a long distance in supplying mineral requirements. In swine feeding this applies to the feeding of breeding stock in particular. Already mention has been made of the advisability of putting up a supply of sods for winter-fed sows and market pigs. Even a pile of earth kept unfrozen is excellent for young pigs. Charcoal such as is often found in wood ashes is excellent.

PURCHASED MINERAL SUPPLEMENTS

There are several commercial mineral mixtures for hogs on the market. With the full knowledge that many of these are excellently compounded, it still may be stated that they are not necessary, provided the feeder makes provision for requirements from cheaper sources. Of the valuable individual feeds valuable from the standpoint of mineral content, tankage has already been discussed. Bone meal of the edible, steamed, variety for live stock feeding purposes and not for fertilizer, is a splendid addition, high in available lime phosphates. One to two pounds per hundredweight of meal may be fed. Commercial charcoal (hog-size) is utilized by many feeders. Aside from the mineral content, charcoal has absorbent and digestive qualities desirable in live stock feeding. Soft coal is utilized widely where it may be secured cheaply. Ground limestone may be given with good results in districts where lime is deficient in the soil. Feed in the meal or as a mixture with bone meal, charcoal, earth and a little salt.

Finally, the whole matter of minerals for pigs is a small and simple one, provided these modest requirements are supplied. A mineral-deficient ration may be followed by many disorders. The great part of these requirements may be supplied from the farm.

SOME GENERAL CONCLUSIONS

1. Grow the frame first.

2. For the proper development of the market hog, the young pig, from weaning until three to three and a half months of age, should receive a ration containing a minimum quantity of fibre.

3. Any system of feeding a bacon pig that tends towards the too early laying on of fat and prevents the maximum growth of bone and muscle during the first four months, tends toward the development of a thicker, shorter carcass, and away from the type that will make into a lean or leanest side.

4. Never feed more than pigs will clean up. Over feeding, particularly of heavy or unbalanced rations, causes unthriftiness which, in turn, is the common cause of short, thick pigs. For the first four months the pig should clean his trough, *and look for more!*

5. The pig is naturally a clean animal,—if he gets a chance to be clean. Cleanliness is of particular importance in the feeding of weaning and weaned pigs. Clean pails, clean troughs and cleanly prepared feeds, have much to do with the prevention of indigestion and scours.

6. The system of feeding employed with the market hog and the pig destined for breeding purposes should differ only very slightly, if at all, up until four months of age. After that age, in the case of the breeding pig, a system of feeding should be employed that will still tend toward growth, muscle, bone, and frame, rather than fat. In the case of the market hog, from four to four and a half months onward, the effort should be towards maintaining length and scale, and at the same time, acquiring finish, through the use of more highly carbonaceous feeds as barley and corn and heavier feeding generally.

7. A suitable ration for pigs (as for all other classes of stock) should be palatable, readily digestible, properly balanced as to protein and carbohydrate,

of fair succulence, and varied as to constituents; so characterized, it will be productive, and if properly fed, is the greatest safeguard to correct finished type and against short, thick pigs, lack of finish, soft sides, etc.

8. The pig is naturally an omnivorous animal,—everything is grist that comes to his mill. The inference is that his ration should contain a considerable variety of suitable feeds. Swine rations commonly lack in this particular.

9. Make all changes in ration slowly, and avoid losses in feed and setback in the condition of the feeders.

10. A pig is a poor patient. Once sick he becomes discouraged. Further, he is particularly difficult to treat. Strive, therefore, to eliminate the causes of disease, and prevent rather than cure.

11. Once more, feature exercise in breeding and growing stock.

12. Lastly, the feeder needs the frame but the packer wants the finish. The select market hog must have both.

THE EYE OF THE FEEDER

Are the pigs active, vigorous and thrifty? Is their hair and colour healthy and right? Any sign of indigestion from over-feeding? Whole volumes cannot give the guidance that one glance affords the observant feeder.

PUBLICATIONS ON SWINE

The following publications of the Department, relating to swine, are available free on application to the Publications Branch, Department of Agriculture, Ottawa.

Farm Feeds	Bulletin 36, S.S., E.F.
Feeding-Stuffs, Commercial	Bulletin 47, S.S., E.F.
Fish Meal as a Live Stock Food	Pamphlet 17, E.F.
Fall Litters	Pamphlet 63, N.S.
Hog and Hog-Grading, Handbook on the Bacon	Pamphlet 40, N.S.
Hog-Cabin, The All-year	Ex. Cir. 101.
Hogs, The Self-Feeder for	Special Cir. 15, E.F.
Oat Hulls and their Use in Feeding-Stuffs	Circular 11, N.S.
Piggery, The Farmer's	Ex. Cir., 96.
Screenings, Recleaned Elevator, as a Food for Live Stock	Pamphlet, 18, E.F.
Swine, Feeding of	Ex. Cir. 60.
Swine Husbandry in Canada	Bulletin 10, N.S.

A full list of publications relating to animal husbandry may be obtained by writing for a *List of Publications.*

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